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American Dental Hygienists' Association

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BLANCHE A. DOYLE
NEW YORK CITY

Chairman of Convention Committee
Ninth Annual Meeting
American Dental Hygienists' Association

General Health In Its Relation To Teeth

W. N. Braley, A.B., M.D., *Health Officer, Highland Park, Michigan*

(Read before the Michigan State Dental Hygienists Association Annual Meeting April 11-13, Detroit.)

SUBJECTS of this kind are receiving more attention every year, and it certainly is an undisputed fact today that dental health has a definite relationship to the general health of the child or adult, and vice versa.

General health does not necessarily mean the presence or absence of infective process, so we can plainly see in the beginning that certain things which might effect one might affect the other. It is necessary then, to go back early in the beginning and discuss the necessary essentials for dental health and the future well being of the child.

There is much we do *not* know about the child, during the different phases of development—but certainly, it is most essential that during intra-uterine life, that proper foods and in sufficient quantities be supplied for the mother for her own normal metabolism, but also enough extra for the proper nourishment of the baby during the intra-uterine phase. Again we may have exceptions to the rule, for at times we find cases in which the mother is in a very good state of health during pregnancy, and the baby when born shows all the signs and symptoms of being very improperly and inadequately nourished. These exceptions are difficult to account for at times, but are most likely associated many times with some phase or type of gland deficiency or abnormality.

Most parents are intensely interested in the first teeth of the baby, for it is news or an event, but as time elapses, the cutting of the other teeth receive less attention and no further care is given, except to have the child brush the teeth once or twice daily. It is about these first teeth—or temporary teeth—that we are most concerned today, in comparison with the general health of the child. It is most essential for good health and dental health that the proper foods be taken—such as milk, butter, eggs, fruit and vegetables. When other things, such as candy, cake, etc., are given—they may not actually cause tooth or dental decay, but may be crowding out certain foods whose essential elements are necessary for tooth building and repair.

Unfortunately in many children the dental decay begins early and which too frequently is indicative of other imperfections of the body, par-

ticularly those which affect the bones, and may make themselves manifest in the form of rickets and other similar conditions.

Of course, when tooth decay starts, it becomes an ideal place for the development of most any type of germ, and then often, the adjacent lymph glands become affected, tonsils and structures in close proximity to the affected area become involved from the infection.

A rather recent report from the U. S. Public Health Service relative to dental decay and corrections among school children is most interesting.

These studies relative to the temporary teeth indicate that very few of the temporary teeth have received dental attention and that the unfilled cavities of permanent teeth increases with the age incidence, also, "when both temporary and permanent teeth are considered together, about 90 per cent of the children in each age group had one tooth or more decayed, missing or filled."

Very frequently children are seen in the pre-school age with defective tonsils and with no history of ever having had tonsilitis. In a large majority of these children, there is a marked tooth decay. It is this type of case that we find most susceptible to infections of diphtheria, tonsilitis, scarlet fever and vincents angina, and many other conditions which affect the upper respiratory tract. If the tonsils are diseased, the conditions may become dangerous, for with any tonsil infection there is always danger of heart disease, chorea and articular rheumatism.

Bad breath is more often thought to be due to stomach upsets, but personally I believe the main cause for it being—carious teeth, infected adenoids, tonsils or sinis disease, and a thorough investigation should be made in these cases.

Clean, sound, healthy, deciduous teeth are as essential to the general health of the child as is necessary for the permanent teeth to be in a healthy condition. It has been stated that when infection occurs in the deciduous teeth that the permanent teeth may become infected much more easily, and we are all aware that the six year molars should be watched for and given special attention, for they apparently decay more easily than the other permanent teeth.

At times we may find children who are having frequent gastro intestinal upsets, malnourished, and frequently in these cases, we find associated one or more teeth undergoing the process of decay. These disorders may be due to the large number of bacteria entering the stomach and intestinal tract from this source, or may be due to the food not receiving the proper mastication on account of the soreness of the teeth, due to such decay.

Unhealthy teeth may cause mental disturbance in the child as well as a marked physical disturbance may be observed. Skin disturbances occur, such as eczema, acne and others, and abscesses, boils and other systematic infections are frequently associated with decayed teeth.

Many cases have been observed in which a neglected gum boil has been the focus of infection for serious cardiac disease as well as a systemic infection in which abscesses of the joints of the fingers and elbows have been noted.

Children are occasionally found to be having a slight rise in temperature and which continues over a long period of time. If no other cause can be found for this fever, the teeth should receive serious consideration, for I have seen just such cases with apparently no tooth decay and no repair work, and on X-Ray examination, have found a tooth which has a focus of infection at the root of the same.

There are certain dental deformities which are rather pathonomonic of principally two conditions. After an injury to the human tooth there is no regeneration and the hypoplasias present themselves. I am referring particularly to the infection of syphillis and rickets. These hypoplasis are not diagnostic—in either of the two conditions in the milk teeth and serological examinations are necessary to reveal the true cause at times.

The familiar abnormalities such as delayed eruption, malposition and early caries are apparently not diagnostic of either condition. With the permanent teeth there are certain characteristics which are diagnostic to a certain degree of syphilitic origin, but largely due to insufficient and proper nutrition and possibly to some serious illness.

It has been stated, and justly so, I believe, that children of school age who have dental troubles are more apt to be inattentive and disobedient with these conditions present. We, of course, could expect more failures with these facts facing us and should be reminded more strongly than ever that the Dental Hygienist should have her place in the school system along with the nurse, the doctor and the teachers. All are essential factors in education and maintaining the general good health of the school child.

Scientific investigation has given us many facts which are essential in correcting many of the existing conditions. Foods with the necessary vitamins and mineral salts must be used for protection purposes and to increase proper body and dental growth. There may be insufficient vitamins or mineral salts, and perhaps the salts may not be in the proper proportions, and then, too, the assimilation and metabolism of the mother or the growing child may be such that even though the proper foods and amounts

are given, the results are not what one might expect and certainly not what one might hope for. It is now a recognized fact that rickets for the most part and dental troubles can be prevented if the expectant mother has had the proper and intelligent care relative to her diet and given the necessary and proper amounts of the different food elements. These, of course, being principally those foods which have an abundance of Vitamin D.

It is now an established fact that there is a definite relationship between rickets and the development of the teeth, and that Cod Liver oil and sunlight are essential as a preventative as well as a curative agent.

The balance diet must contain proteins, carbohydrates, fats and mineral salts, and these have to be in proper proportion to obtain their best assimilation. We recognize that fat digestion takes place better with relatively high carbohydrate percentage present and the same being true of the protein digestion—and so it is now being accepted to a greater or less degree that certain principles likely exist relative to the vitamins present, and that the best bone and dentin is formed when the elements of calcium and phosphorous are abundant and approximately equal in amount, and that the Vitamin C is greatly stimulated and utilized when Vitamin D is present.

So we see that it is quite essential that in the diet it is necessary to observe the above factors in order that it may be correctly balanced to insure the best possible bone, dentin and tissue development. It would appear, then, that there must be a vitamin balance and a mineral balance for proper nutrition.

If these factors are not more or less constant all the time, there may be a breaking down to some degree of the body tissues, and tissues of the mouth and ultimately makes itself manifest in possible dental caries and constitutional conditions, such as diseased tonsils and adenoids, kidney and gall bladder infections, sinusitis, anaemias, septicaemias, tuberculosis, etc. It seems that it is perfectly logical to assume that all of the conditions may affect each other, i. e., carious teeth may cause the drag and constitutional conditions develop; or constitutional conditions may cause the drag and dental conditions develop as the result.

From the work of Blunt and Cowen (Ultraviolet light and Vitamin D in nutrition), we have the following, "We cannot apparently at the present time fix the responsibility for the health of the teeth upon any one element in the diet. Possibly we shall never be able to do so. But it can be said without hesitation that the most common dental disorders are primarily dietary deficiency diseases."

From the investigation of Dr. McCullom we find that Vitamin D is most essential for bone and tooth structure—and general nutrition, and that Vitamin C is also essential for the proper protection and growth.

With the amount of investigations, which have been done, we certainly must assume that general health and dental health bear a decided ratio to each other, and that most likely the lag in general health is later made manifest by dental caries. Also as a means for better health, both constitutional and dental, there should be more dietary regulation, particularly with reference to the vitamin and mineral reinforcement. General physical examinations, at regular intervals, and regular routine prophylactic supervision of the mouth.

So, in summing up the whole, we (the teacher, the Dental Hygienist, the Doctor and Dentist) all have a definite responsibility relative to carrying out our part of the recommendations as made, and work to the ideal which President Hoover has given us in his statement made at the White House Conference, "If we could have but one generation of properly born, trained, educated and healthy children, a thousand other problems of government would vanish."

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Childrens' Dentistry for the General Practitioner

BEN KLETZKY, D.D.S., *Pueblo, Colorado*

(Read Before the Annual Colorado State Dental Association Meeting at Estes Park, June 30, 1931, and Reprinted by Permission)

HOW often we hear repeated the saying, "and a little child shall lead them"—and how *true* this is. However, we as dentists, practicing for the welfare of our patients, both large and small, are faced with the all-important and essential problem of leading the little child—leading him or her along the pathway of oral health, so as to make the pathway to general health easier and more certain.

When we consider that 95 per cent of our children of school age are suffering from carious teeth, that innumerable children of the pre-school age are losing their teeth because of caries, that upwards of 45 per cent of the cases requiring orthodontia are the direct result of the early loss of deciduous teeth, and that 99 per cent of these catastrophes are absolutely preventable, it awakens within the dental profession a sincere desire to know more about the causes and to do more about the results.

Though there is an ever-increasing number of pedodontists, devoting their entire time exclusively to children's work, the vast bulk of this work still falls to the lot of the general practitioner, the family dentist. That the going may be made a little easier for the general practitioner when it comes to coping with this problem I will undertake, in this paper, to set forth some few ideas that may help to solve some of the problems of every day practice in children's dentistry.

Contrary to the general opinion of the profession, the field of children's dentistry is a broad one. In practicing it the dentist holds within his hand the key to a healthy, normal adult dentition. The moulding of the entire facial machine comes within the scope of the man who gets a clear mental picture of the remarkable things that can be accomplished through the thorough study of each case as it presents. Later in this paper I will go into the operative procedure necessary for restorative work in the deciduous dentition. But before I do that, if you will allow me, I want to bring out the things that have been proven effective in preventing the necessity of restorative work, and try to remove that field from the realm of the mysterious and place it before you in as understandable a manner as I possibly can.

Much has been written about pre-natal care of the mother, both operative and dietary, but the great bulk of this material has been so buried

within statistical and scientific phraseology that the average busy general practitioner has found it difficult to wade through it to secure the real information which could be used and passed on to the patient.

The intelligent care of the child's teeth must start with the mother while the child is being carried. The mother's mouth should be placed in perfect condition, and in a state of absolute comfort. The old fallacious belief that dental care of the expectant mother was injurious and dangerous has been disproven completely, and should be relegated to the limbo in which also belongs the time-worn but untrue axiom—"a tooth for every child." True, long tiring operative sessions may result in undue nervous strain and upset the metabolic balance of the pregnant mother, but the dentist that proceeds carefully and painstakingly to do the necessary operative work which will restore and maintain efficiency in the dental mechanism of the mother is doing an untold amount of good.

A thorough prophylaxis often tends to alleviate the nausea which often accompanies this condition, and often when a tooth brush and dentifrice have a tendency to gag the individual, a complete prophylaxis followed by instruction as to proper brushing technique using salt as a scouring medium, followed by a wash with milk of magnesia, will attain a degree of comfort for which the patient is markedly grateful.

Teeth which cannot be made comfortable and safe should be removed under the anaesthetic of choice. I prefer to use novocain with minimum amount of adrenalin for this purpose.

With reference to the diet to be followed by the mother, by all means collaborate with the physician in charge of the case. He is usually very anxious to do all that he can to help us build a sound dentition through prescribing the proper diet, and the patient will co-operate more readily when the dentist and physician are in accord.

Our purpose is twofold—first, to build sound tooth structure in the child, and, second, to maintain sound tooth structure in the mother. Remember that what the child needs it takes, and providing that there is sufficient of the body building substances to be had, from the mother, the child will not suffer from lack of them. Ofttimes the dental mechanism of the mother goes to pieces as a sacrifice, needless as it is, so that the child may have the proper metabolism. To prevent this the mother must be instructed to eat at least one-third again as much of the body building foods as she would under normal conditions. She must have an abundance of fresh fruit, such as oranges, grapefruit and apples; plenty of *fresh* green vegetables, as lettuce, spinach, asparagus and cabbage, and carrots; whole milk, unpasteurized, eggs and meat. So long as the diet is built around these things, some one or two of them at each meal, other things

eaten are not so important and can be eaten according to individual taste—but the things outlined above *must* be eaten religiously.

During pregnancy the health and tone of the gingival tissue must be watched carefully. Seeing the patient as often as once a month is warranted, and, in some cases, essential for the maintenance of gingival health. The red, swollen, and easily injured gingival tissue is indicative of a disturbed metabolism and a tendency, natural though it may be, toward laxity in home care on the part of the patient. This period is very trying for the patient and a tendency toward neglect must be counterbalanced by an *increased* vigilance on our part. The gingival tissue can be maintained in a state of health through careful prophylaxis and home care. Be firm with the patients that tend towards neglect, and insist on vigorous gingival massage at home, explaining your reasons. Too often we take the matter of home oral hygiene for granted and our patients go through life caring for their teeth in a haphazard slip-shod manner, when it is so easy to explain to them the proper method of brushing, and otherwise cleaning the oral cavity. In collaboration with the physician, after the birth of the child, a great deal can be accomplished through proper instruction as to calcium constituents in the diet of the bottle-fed baby. There is no substitute for mother's milk, but unfortunately an ever-increasing number of children are deprived of it and of necessity are bottle-fed. That the food administered in this manner must be properly balanced, goes without saying. The mechanical injury that may ensue due to improper habits of bottle feeding manifest themselves later in life through such deformities as a receding mandible and lingually depressed incisors brought about by the resting of the bottle on the child's lower jaw during and after feeding. This injury can be avoided by insisting that the bottle be held by an adult throughout the feeding.

Cleansing of the infant's mouth with a cotton swab saturated with sweetened boracic acid solution should be routine and prevents mucous membrane irritations and infections such as thrush and other infant oral inflammatory conditions.

When the eruption of the deciduous teeth begins it is sometimes necessary to assist them in cutting through the surface membrane. Finger massage should be tried first, and if that fails to relieve the condition it is sometimes necessary to resort to lancing. For this purpose use a lancet dipped in phenol, or the actual electric cautery. Both are practically painless and sear the edge of the incision preventing healing by first intention. In the incisor region the incision should be parallel with and immediately over the incisal edge; in the posterior region a criss-cross incision, starting at the dicto-buccal and crossing the occlusal to the mesio-

lingual, and then from the disto-lingual to the mesio-buccal.

The child's first regular visit to the dentist should be as early as possible. By that I mean, that as soon as the first deciduous molar erupts regular periodical examination of the child's mouth should be instituted. When you see mouths of children barely two years of age badly crippled due to caries the importance of early attention is forcibly brought home. If we get them early enough it is often possible to institute corrective measures which assist in arresting carious conditions and preventing new ones from developing. It is unfortunate that the majority of our children must associate their first experience with the dentist with a toothache and subsequent extraction. How infinitely much better it is to prevent toothache than to relieve it, and how much better it is to save teeth and maintain them healthy and sound to the end of their usefulness, than to remove them, crippling the child's dental mechanism even before the child has a chance to learn to use it fully. These little patients that are brought in for prevention become our best patients. They are eased into the dental operative procedure gradually and are prepared for it. Their periodical visits become as play to them, and in these children is set up a desire to be free from dental decay, and when the dentist is able to inform them that they have none, they take the information as a personal achievement and glory in it.

Due to the histological and anatomical peculiarities of the deciduous teeth caries, if neglected, takes its toll rapidly. Because of this, no child should be allowed to go more than three months without a thorough dental examination. Not only should the explorer, mouth-mirror and mouth-lamp be used, but the roentgen-ray should be resorted to. Caries in the inter-proximal surfaces of the posterior deciduous teeth is equally as difficult to discover in its incipiency as in the adult dentition. Due to the constriction at the gingival and the comparatively large pulp chamber in these teeth it becomes doubly important that we discover and correct carious conditions early. The ordinary X-ray film, if doubled across the short dimension, is easily introduced into the diminutive child's mouth, and four of these films, one in each posterior region, will suffice to ray the necessary teeth and will save many a tooth as well as a great deal of embarrassment on the part of the operator in case he may chance to overlook a cavity or two and the patient next present with an aching tooth. It is much easier to explain why one should X-Ray than why one didn't.

Much has been written about child management. Child psychology is, naturally enough, but immature adult psychology. To be able to handle children skillfully is an art, with some inherent, but with others it must

be acquired. In this latter class belong the vast majority of general practitioners. A few general rules and suggestions as to how best to handle children may not be amiss here, though I will not dwell upon it at length. First try to place yourself in the child's position and frame of mind. Imagine yourself going to the dentist for the first time, completely ignorant of what is held in store for you, and perhaps filled with exaggerated stories as to the tortures one may expect at the hands of the dentist. Working from that standpoint you will find it easy to understand the average child's reluctance and temerity when confronted with the imposing array of equipment the modern dental office presents. Working from that angle it is much easier to proceed. Be kind, patient and truthful. Try to be understanding and make the child feel that you are concerned about him or her alone. Use the child's first name in addressing it. Explain the use of the various "gadgets," as they seem to the child. Paramount above all things *BE TRUTHFUL.* If a certain operation is going to hurt *SAY* so; and if not, say so. The child then soon learns to believe you, and a confidence established which withstands many an operative pain. When it becomes necessary to use the engine, and very few cavity preparations can be properly made without its use, demonstrate the use of the bur on the finger-nail, first your own and then on the patient's. That little trick has eased the mind of many a little patient, and thus permitted cavity preparation that will retain the restoration. Just one more point before leaving the subject of child management—a child can be handled with greater success if in the operating room without the parent. Insist on that point and you will find that a great deal of the difficulty of managing the patient will be dispelled. The fact that the child is alone with dentist and assistant places that child "on its own." It imparts a feeling of self-reliance to the child which is conducive to better behavior and co-operation. Every child wants to be considered grown up—take advantage of that fact, and half the battle is won. Then, too, if as sometimes occurs in the best regulated practices, the child becomes obstreperous and firmness is demanded, it can be more expeditiously resorted to without any undue explanation to the parent who, through natural instinct, might be too easily dissuaded and upset by the child's apparent discomfiture.

Now let us take up the operative procedure incident to the practice of children's dentistry. Fundamentally cavity preparation and filling procedure in deciduous teeth does not differ from that formulated for the adult dentition. The principles of extension for prevention and extension for retention, as set forth years ago by G. V. Black, must be adhered to, though of the two factors, extension for retention, in my opinion, is the

MOST important when dealing with the deciduous dentition. Too often it is possible to directly attribute the loss of a filled tooth to improper and inadequate retentive form. As far as I am concerned, the V-shaped cavity for interproximal restoration is absolutely condemned. Interproximal cavities must be prepared with a definite seat, pulpally and gingivally, and with a definite occlusal lock or dovetail; otherwise failure will result.

First we will take up in detail the preparation of interproximal cavities in the deciduous posteriors, as this class of cavity is the most prevalent and its proper treatment is responsible for the greatest loss of deciduous teeth, prematurely, with the subsequent migration of teeth and development of mal-occlusion. In all classes of cavity preparation bear in mind thas one rule—ALWAYS USE SHARP EXCAVATORS AND SHARP BURS. In order to obtain maximum results with minimum discomfort to the patient, be gentle but decisive in the use of excavators—make every movement count.

With enamel hatchets break down overhanging enamel margins to cavity outline desired. It is not necessary that margins be carried far out into the embrasures. Just to the embrasure will suffice and add greater strength to the approximal portion of the filling. Using as large a spoon excavator as the case will permit, remove the remainder of the decay into the depth of the cavity. When the bulk of the caries has been removed and the gingival and axial walls are exposed fully to view, take smaller spoon excavators and remove the last vestige of caries. It is better to remove all the visible decay, even going so far as to expose the pulp where necessary, and then cap it and thus have a chance of saving the tooth, than it is to leave a portion of decay and invite certain death of the pulp and subsequent abscess. With the approximal portion of the cavity prepared, turn to the occlusal step or dovetail. Using a number 557 cross-cut fissure bur in the smaller posteriors, or a 559 in the larger ones, in the contra-angle handpiece, and explaining the use of the bur to the patient, cut a definite step in the occlusal at least 1⅓ mm. in depth and 1½ mm. in width at its narrowest portion. Too wide a step will endanger the horns of the pulp, and too shallow a step will allow the filling to fracture, due to insufficient bulk of filling material. In a large measure the success of your filling depends upon this step, so be doubly careful in its preparation, for in case of an error it is usually not discovered until the patient again presents, this time with an abscessed tooth, due to early fracture of the approximal portion of the filling and recurrent caries.

In case encroachment upon the pulp was encountered upon removing

the last bit of decay, or where the axial wall of the cavity is so close to the pulp, though not actually exposing it, that its vitality will be endangered through constant thermal shock, and the case gives no history of toothache prior to the time of operation, a pulp capping or cavity lining consisting of thymolized calcium phosphate or chemically pure zinc oxide mixed to a thick paste with eugenal should be applied directly over the deepest portion of the cavity. Before placing this lining isolate the tooth with cotton rolls and saliva ejector, flush cavity with sterile distilled water, dry with warm air, apply phenol compound to exposed dentins, followed by alcohol. Dry again with warm air and gently place lining in position, being careful not to exert any undue pressure. Over this lining flow a base of red copper cement. Reshape the approximal portion of the cavity so as to obtain a slight undercut, and the cavity is ready for the metallic filling.

In the case of extensive caries in the posterior teeth where the interproximal and occlusal form are all one, remove the caries with large spoon excavators and obtain some retentive form through establishing an undercut along the axial wall all around the cavity through the use of a medium-sized inverted cone bur. The cavity should then be sterilized with Howe's silver nitrate and formalin, and following this thoroughly dried and filled with red copper cement. These cavities, due to their size and inability to retain metallic filling material which requires more retentive form than it is possible to obtain, require constant vigilance and refilling, but the great measure of success in retaining these badly broken down teeth until they are no longer needed, repays the operator for additional precaution in their care.

In the posterior teeth and in the distal of the cuspids the filling material of choice, in my opinion, is copper amalgam. Its inherent germicidal action more than out-balances the difficulties some encounter in its manipulation. A great deal of the objection to its use due to its slow setting can be overcome through the addition of a few grains of silver alloy to each mix. Most operators try to manipulate it in a too plastic state. Express the excess mercury until you achieve a mix which is smooth, dull, and appears almost stiff when held in the palm of the hand and the finger is run across it with considerable pressure. Such a mix will be found to be sufficiently plastic for all purposes and will set up within an honr's time.

In placing the filling material in proximal cavities always use a matrix. Each operator will accustom himself to whatever type he prefers, but use one he must, for it is essential in reproducing tooth contour, condensation of the filling material, and in the prevention of gingival tissue

impingement. In my hand the matrices made for the Ivory number eight retainer, used without the retainer, are quickest and easiest to use. They are long enough to allow a flange to protrude to the lingual and buccal and are made in single and double construction. The double construction matrix comes in very nicely for placing two approximate fillings at the same sitting.

In placing the matrix, isolate the tooth with cotton rolls, place the saliva ejector, dry and sterilize the cavity and place the matrix in position, carrying it well below the gingival margin. Holding it in place with the thumb and forefinger of the left hand place a wooden wedge, such as a portion of toothpick, between the matrix and the adjacent tooth, well down toward the gingival. This serves to prevent the filling material from flowing past the gingival margin and also assists in maintaining the matrix in position. The filling material can then be packed into place, a small portion at a time, expressing the excess mercury, until the cavity is over filled. The excess material can then be carved away to approximate occlusion. The wedge is removed and the matrix is withdrawn either to the buccal or lingual, never toward the occlusal, for invariably a portion of the filling will come with it if it is withdrawn toward the occlusal. The filling is then carved to accurate occlusion, the buccal and lingual margins trimmed to their correct position. The patient is emphatically cautioned against chewing on that side of the mouth, and the parent is instructed to give the child a more or less liquid meal when mealtime comes.

Interproximal cavities in the cuspid teeth present their peculiarities in the deciduous, even as they do in the adult dentition. I find that using a small taper fissure bur and cutting through the angle, sweeping from buccal to lingual and vice versa, preparing a cavity which is wider at the gingival than at the incisal and wider at the axial wall than at the enamel margins, gives me a retentive form which satisfactorily holds the filling, and also produces a cavity form into which the filling material can be manipulated much in the same manner as in the posterior teeth. For the distal cavities I use copper amalgam, but for the mesial cavities, in girls especially, it is sometimes advisable to use oxyphosphate cement, though our primary and paramount object in caring for the deciduous teeth is their preservation, and esthetics should be allowed to play only a very minor part where the success of the operation is at stake.

In preparing cavities in the anterior teeth, always bear in mind the proximity of the pulp to the surface and cut the cavity so that the pulpal wall is convex from buccal to lingual.

The four incisors are usually of two typal forms, the thick short

tooth and the thin longer one. The thick short incisor is less prone to decay and when decay does occur it is easier to cope with. The thin bluish white incisor decays readily on the proximal surfaces, and due to its extreme thinness labio-lingually precludes a great deal of cavity preparation. These teeth are usually best treated by taking a safe-side disk, running in water, and slicing away the angle, opening up the embrasure, allowing for a free passage of fibrous foods. With sandpaper disks polish the proximal surfaces, removing the decay. When that is done precipitate silver nitrate with eugenol to protect the exposed surface from further decay. These teeth should be examined at regular short intervals to assure no further decay and their early loss.

The thick incisor with proximal decay will allow us to prepare the cavity along the general outline of the normal class three cavity, using a small inverted cone bur to secure an undercut all the way around the axial wall, and removing the remainder of the caries with the ordinary hoes and hatchets employed in class three preparation. With the cavity prepared it can be easily filled with copper amalgam, using a plastic instrument with a very small blade, working the filling material into the cavity in much the same manner that synthetic is manipulated.

It is very rare that gingival third cavities are found in posterior deciduous teeth, but their presence in deciduous anteriors is prevalent enough to warrant taking the time to say a word about their care. Their incipiency is due to faulty oral hygiene, and this fact must be impressed upon the parent and child. They are easily prepared, using as large a spoon excavator as possible and removing the decay to the depth of the cavity. With a large inverted cone bur carried entirely around the border of the cavity secure the necessary retention. Silver nitrate is deemed advisable. The cavities may be filled with either oxyphosphate cement or copper amalgam, esthetics here being allowed to determine the material used.

So far my paper has dealt with operative procedure for the deciduous tooth alone. We now come to the first permanent molar, which too often through the neglect of both patient and operator, is not permanent at all.

When the time draws near for the eruption of the first permanent molar it is the duty of every dentist to call the attention of the parent and the child to the fact that it is about to erupt, and at that time explain to the parent its importance and the necessity of careful vigilance upon our part to obviate its early loss through extensive caries. Until this particular tooth is fully erupted it is a difficult matter for the child to perform the proper prophylaxis in this area, consequently the bulk of the responsibility evolves upon the dentist. As soon as the occlusal sur-

face makes its appearance through the tissue the area should be isolated and the tooth thoroughly dried. The occlusal fissures and grooves should then be carefully gone over with a sharp explorer, and if a cavity is found it should be drilled out to its depth and filled at this time with a copper cement. This is important, for at the time of the eruption of these teeth they are very susceptible to rapid and extensive caries and unless it is checked early pulp exposure and loss of the tooth will result. It will usually be found that where the fissure extends to the dento-enamel junction the decalcification will extend beyond that point and the cutting should also go beyond. Too often operators fail to carry the preparation deep enough and extensive decay in the dentine goes on unmolested, the patient and operator in the meantime being unaware of its presence.

The buccal grooves must also be carefully examined as soon as the tooth has erupted far enough for this to be done. Often caries has already set in in these developmental faults apparently before the tooth has had a chance to erupt and early diagnosis and care is imperative.

When the tooth has fully erupted a more permanent restoration should be placed, always being sure that the first cement has been thoroughly removed before placing this second restoration, thus checking on the arrest of the initial caries.

It will be found that a great many of these six-year molars can be more satisfactorily restored under local anesthesia, which will allow the operator to remove the last vestige of decay without fear of hurting the patient. The patient, as a rule, at this age can be reasoned with well enough to be made to understand the advantage of the anesthetic and will readily submit to the injection.

The hypoplastic tooth, so often found in the six-year molar and the eight permanent incisors presents a problem which often presents a problem which often perplexes the operator. The hypoplastic enamel is due apparently to the ravages of such diseases as typhoid fever, whooping cough, measles, chicken pox, diphtheria and other diseases directly affecting the epithelial structure of the body. The enamel structure of these teeth is rough and pitted with a developmental fault completely surrounding the crown of the tooth caused by the arrested development at the time of illness. These faults should be carefully examined for beginning caries, and should be excavated and filled upon discovery. Cement fillings will serve to preserve the tooth until such time as development has progressed far enough to enable the operator to place onlays on the posterior teeth and porcelain jackets on the anterior without danger of pulp encroachment.

Accidental fracture of the upper incisors soon after their eruption

is a heartbreaking condition to contend with and taxes the ingenuity of the operator to the utmost. Often this type of injury presents an exposed or nearly exposed pulp which must be protected if the tooth is to be saved. Root canal work at this time is out of the question as the root end is not fully formed. In my office I have had a fair measure of success with this type of case using the following treatment: The patient presenting as soon after the accident as possible the tooth is isolated with cotton rolls and the exposed area is cleaned thoroughly with sterile distilled water followed by phenol and alcohol. The area is then dried and a pulp capping of Sedative Cement mixed quite thick is placed over the entire incisal edge. A crown measurement having been taken a crown of 24k gold is constructed so that it will be in infra-occlusion. This is filled with thin oxyphosphate cement and gently placed in position. This effectively protects the pulp from thermal shock and because of the splendid resuperative faculty of pulp tissue at this early age the tooth will often retain its vitality completely, otherwise it will remain vital long enough to enable the root end to be formed to allow a possible root-canal treatment.

My paper thus far has dealt with operative procedure for the cases that we feel reasonably sure can be restored to a healthy state. Let us take up for a moment the subject of the treatment of teeth which cannot be restored to a state of health. In my opinion, the abscessed deciduous tooth has no place in a child's mouth. If, unfortunate as it may be, the visit to the dentist is delayed so long that teeth are allowed to abscess, they should be extracted, and space retainers placed to maintain the space until the permanent tooth erupts to take its place. Because of the fact that the organisms found in abscessed deciduous teeth are identical with those found in abscessed permanent teeth and the end result of their retention may be a heart lesion, a rheumatic tendency, or a general debilitation, I feel that it is far better to sacrifice the tooth and even risk the necessity of orthodontic treatment, than it is to retain the tooth and set up within the child some diseased condition which may not make itself evident until adult life.

In the matter of extraction for children an anesthetic of some type should be used for removing all but very loose teeth. No operation that we must perform for the child can do more to destroy a confidence carefully built up than a careless extraction. The day of "yanking" deciduous teeth is gone. The vast majority of children, when extraction becomes necessary, can be told of its necessity and will gratefully submit to the administration of an anesthetic of some type. Local anesthesia through infiltration or even nerve block can be done. In cases where local anesthesia is not desirable, as in the case of a badly swollen condi-

tion or an acute abscess condition, ethylchloride as a general analgesic works very nicely. It has been my experience that an extraction performed under an anesthetic results in a grateful patient and it serves to heighten the confidence already atttained. Wherever possible, extraction should be left until the last visit.

In a paper of this type it is only possible to touch upon the salient points of the subject matter, as the field is an ever-increasing one and a great deal must be left unsaid. In closing I wish to summarize the points of this paper which I feel to be of importance.

1. The greater portion of children's dentistry must be done by the general practitioner.
2. So that the greatest amount of preventive dentistry can be done we must start with the mother, and institute a proper prophylactic and dietary regime.
3. Child management in the dental office is not difficult and can be mastered by the majority of general practitioners if a little time is given to its study.
4. A definite technique of cavity preparation must be followed in the care of deciduous teeth to assure success.
5. Choice of filling materials should be from the standpoint of their ability to save teeth, esthetics being of secondary consideration.
6. The six-year molar must receive immediate attention to assure its permanency.
7. Abscessed deciduous teeth must be removed, and space retainers placed if deemed necessary.
8. Some anesthetic should be used for extracting teeth for children in all cases except those of very loose teeth.

Order Your National Pin Now

The National pin that we read about some time ago is now ready and may be ordered from your State secretary or from Miss Ione Jackson, Dental School, University of Minnesota, Minneapolis, Minn.

The cost of the pin is $8.50 and the guard will be furnished just as soon as each state selects the design they would like to have.

Notice of State Meeting

The Wisconsin Dental Hygienists' Association will hold its seventh annual meeting June 7th, 8th and 9th at the Schroeder Hotel, Milwaukee, Wisconsin.

A very interesting program is being arranged and a most cordial invitation is extended to all members of the dental profession, dental hygienists and dental assistants.

DOROTHY K. LEHMAN,
Secretary.

California Dental Hygienists' Association

The Twelfth Annual Meeting of the California Dental Hygienists' Association will be held at the Biltmore Hotel, Los Angeles, on June 15th, 1932, jointly with, and as guests of, the Southern California State Dental Association.

A practical clinic demonstrating a complete prophylaxis, tooth brush technic, instrumenting and polishing will be conducted by a senior Dental Hygienist student of the University of Southern California Dental College.

In addition, a table clinic demonstrating the most modern Prophylaxis instruments and supplies will be given, and a further feature will be an Educational Clinic showing various phases of Dental Hygiene work in public school throughout the State.

An informal dinner will be held at the Cafe Victor Hugo, Los Angeles, on Wednesday evening, June 15th, at 6:30 P. M.

A cordial invitation is extended to all dentists, dental hygienists and dental assistants to attend.

Annual Meeting of the Georgia State Dental Hygienists' Association

The Georgia State Dental Hygienists' Association will hold its Fifth Annual Meeting, June 8th and 9th, 1932, at the Biltmore Hotel, Atlanta, Georgia.

The Program Committee has been fortunate in obtaining the following speakers as a part of a most interesting and educational program: Miss Evelyn M. Gunnarson, New York City; Dr. Aldred C. Fones, Bridgeport, Conn.; Dr. C. J. Hollister, Harrisburg, Pa., and Dr. Clayton H. Gracey, Detroit, Mich.

A cordial invitation is extended to members of the dental profession, dental hygienists and dental assistants.

CORNELIA PROCTOR, *Publicity Chairman,*
713First Nat'l. Bank Bldg., Atlanta, Ga.

September in Buffalo

Just as the Pied Piper of Hamelin won "All the little boys and girls, with rosy cheeks and flaxen curls," to follow him, by telling in his flute-like notes of the pleasures and delights ahead of them, I, as a harbinger or ballyhoo man, wish to tell you of the pleasures of the coming annual convention in Buffalo, so you'll all want to come.

On Sunday afternoon, September 11th, at the Hotel Lenox, The American Dental Hygienists' Association will give a tea for its Honorary Members, the officers of the American Dental Association, and for the trustees and officers of the American Dental Assistants' Association. The Hotel Lenox is a charming setting for such an occasion, and this will be a splendid opportunity for renewing old acquaintances and making new ones.

The Buffalo Society of Dental Hygienists is sponsoring a "Get Acquainted" luncheon for Tuesday noon. Here we'll learn the "Who's Who" in our membership, and will hear a novel radio program.

The annual banquet for all members is Wednesday night, and a splendid program has been prepared. The banquet is given in honor of our President-Elect, Mrs. Helen B. Smith, of Bridgeport, Connecticut.

As Buffalo is so near the Rochester School of Dental Hygiene, the Alumni of that school will hold a reunion at a luncheon given Thursday noon. This event is being planned by a committee of Rochester graduates, and Miss Edith Hardy is the Chairman.

An all day tour of Niagara Falls is our plan for Friday, and is the finishing touch to the meeting's entertainment. The Committee in charge is made up of Niagara Falls girls who will tell in a coming issue of the Journal more about their plans. Enough for me to say that they have planned a day cram full of enjoyment, and one that no one will want to miss.

September is ideal vacation time, so let us plan to put aside our work, pack our bags, and make this annual meeting a pleasurable one as well as profitable.

AMERICAN DENTAL HYGIENISTS' ASSOCIATION

President: EVELYN M. GUNNARSON, 475 Fifth Avenue, New York City.
Secretary: AGNES G. MORRIS, 886 Main Street, Bridgeport, Conn.
Treasurer: ESTHER RUSSELL, 507 Main Street, Worcester, Mass.

Neither the editors nor the publishers of THE JOURNAL are in any way responsible for the statements and opinions expressed in any article.

Editorial

DOING OUR BEST

HAVE you ever sat in an easy chair, late at night, when all about you was conducive to deep thought and tried to realize just what your obligation to life in general might be—what were your responsibilities—where should they begin or end—in fact just what you owed the whole world because you are a part of it?

Life for us is a very perplexing problem; we take each day as it comes and wonder what it will bring forth. Sometimes, I wish I were a bird or an animal, bereft of the power that makes one question and worry—just to be free and not have a care in the world.

Recently I visited an institution for the feeble-minded and never have I been so impressed. I suddenly realized that the majority of those people possessed the thing that I had longed for; freedom from care, from worry concerning others, a total blindness to all that was going on about me. One old man talked incessantly about the joys that had been his in boyhood, another played the piano and talked as though he were on the most intimate terms with Beethoven, Mozart and others of our most beloved composers. They were all, for the most part so free and happy but suddenly I remembered—but what of their loved ones at home; were they too care-free or were their hearts heavy with sorrow for those who were once a part of them but now of a different world.

We know not the direct causes of all these conditions but statistics tell us that one-fifth of the world's population spend some part of their lives in a Mental Institution. Conditions at the present time are such that I fear that the ratio will be greatly increased and it has made me set aside another hour to prove to myself and perhaps to you that our true responsibility is toward our fellow-man; the extent as great as lies within our power.

We chose a profession to serve humanity and for the sake of those who are to follow in out footsteps—for the sake of those we serve we must offer only our best.

We may feel that too much is expected of us but we all have a conscience and that should be our guide. Act as your own employer for a while and be the judge of whether you are doing what you would expect of someone whom you were employing. Measure yourself by what others are doing and develop within yourself those things which you are capable of doing regardless of time or energy.

At no other time as now are we compelled to do our best. Those of us who are working should appreciate the fact that we have positions but it is not well to stop there. Let us realize also that it is our opportunity to show how much we can do and how well we can do it.

Annual Meeting

The Ninth Annual Meeting of the American Dental Hygienists' Association will be held in Buffalo, New York, September 12th to 16th, 1932.

AGNES G. MORRIS,
Secretary.

The Enamel

By HERMAN R. CHURCHILL, D.D.S., *Tandarts (Holl.)*
(From the Histo-Pathological Department of the Thomas W. Evans Institute, University of Pennsylvania)

THE enamel is a unique calcified substance. It is different from all other human structures. The enamel is produced by cells of ectodermal origin, the *ameloblasts*. These cells produce globules of a substance which after having undergone certain modifications, calcify, forming *enamel columns or rods*. The enamel rods are connected by an *inter-columnar substance* which is organic (keratinous) in nature. Formed enamel contains only minute quantities of this organic material. The rods are composed of mineral matter, which constitutes a complicated inorganic picture; it contains carbonates and phosphates of calcium, some magnesium hydro-phosphate and water of combination.*

The enamel rods are not straight but form spiral curves, a fact which lends great strength to the enamel; they present varicose (beaded) outlines. The width of the enamel rods is ± 5 micra; we can place ± 50 of them in apposition with the diameter of a hair of the human scalp. (See Fig. I.) If we compare, with the aid of a microscope, the cutting edge of an enamel chisel with the size of enamel rods we see that it is not possible to split the rods apart with this instrument. In a section of enamel the spiral curvatures are evidenced by lines which run in general direction at right angles with the enamel surface. They are called the *Lines of Schreger,* their number is indicative of the enamel strength.

We may also observe other lines, of a brownish hue, running parallel with the enamel surface. They are the *Striae or Bands of Retzius* which probably represent areas of incomplete calcification. They have been explained by the fact that calcification is more or less interrupted at intervals; these Striae correspond with the imbrication lines on the enamel surface. (See Fig. II.)

At the junction of enamel and dentin we often find evidence of a faulty enamel formation. Certain spindle shaped and tuft-like designs may occur in this region. They are called *enamel spindles* and *enamel tufts*. To these developmental areas must, in the light of our present

---

* *Chemical Composition of Enamel According to Hoppe-Seyler:*

$Ca_{10}\ CO_3\ (PO_4)_6$ - - - -	95.35%
$Mg\ HPO_3$ - - - - - -	1.05%
Organic Substance - - - -	3.60%
	100.00%

Handbuch der Physiol. und Pathologisch—Chem. Analyse, 1893.

knowledge, also be added the *enamel lamellae,* lines of variable thickness connecting the enamel surface with the amelo-dentinal junction.

As to the *vitality of the hard tooth structures* many opinions might be cited.

Considering the reactive possibilities of these structures, the question arises: What may be possibly contributed by the pulp and the dental periosteum to the vitality, in particular to the functional characteristics of the tooth?*

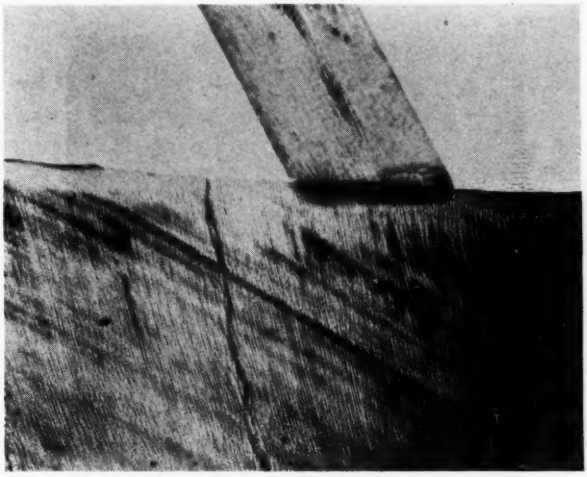

FIG. 1.—Scalp hair applied to surface of enamel.

We know that the dentin, in contact with tissue liquid, is kept moist. We also know that under certain circumstances, ions and even molecules of fluids have been brought to and passed through the enamel of a dog's tooth.**

Karlström's*** researches have led us to believe that changes in the enamel do occur. Roseburry† points out that keratin, although a product of living cells, is itself a lifeless substance, and cannot participate

* Churchill, H. R. Discussion before the N. Y. State Dental Soc. Dental Cosmos, February, 1932.

** Klein, H.-Anderson, W. R. Journal D. R., Vol. IX. 1929.

*** Sam Kalström—Physical, Physiological and Pathological Studies of Dental Enamel with Special References to the Question of Its Vitality. Stockholm, 1931.

† Roseburry—Bio-Chemical Study of the Protein in Dental Enamel, J. of D. R., Vol. X, No. 2, 1930.

in nutrient changes. Physiological processes in the broadest sense must be utterly slow in this densest of human structures.

If the porosity of the dentin offers a sufficient allowance, we can conceive that molecules of calcium phosphate may be carried into this structure or may be withdrawn according to changes in the calcium and phosphorus concentration of the blood. Microscopically, we have observed changes in the refractive index of the dentin of certain teeth, and clinically, we notice that sound teeth gradually assume a darker hue. Therefore, we may presume that some changes do take place in the dentin.

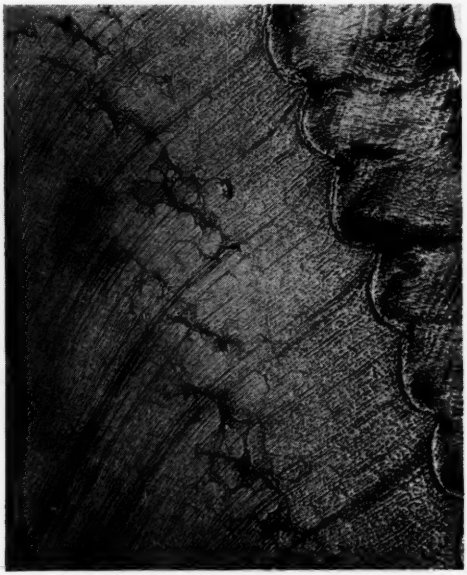

FIG. 2.—The amelo-dentinal junction presenting scalloped features.

The dental periosteum contributes to the cementum and the corresponding peripheral part of the dentin, its share of the tissue liquid. We may deduce that, even if the pulp is removed, the tooth may not be regarded as a completely non-vital structure. Chemical exchanges are still possible. The superficial area is still permeable to the body fluid, a fact which is determinitive in the matter of attachment of the tooth to the jaw.

When its supply of tissue liquid completely ceases, as, for instance, in the last phase of a chronic marginal parodontitis, then the tooth has

lost its functional characteristics. The tooth is doomed, and is sequestrated.

We believe that at least part of the hard structures of a tooth gives evidence of vital phenomena, which includes functional phenomena, until both the pulp and the dental periosteum are lost.

Enamel is fairly inert, brittle and very hard. Its color is white with a blueish hue in newly developed teeth, but changes with age to different shades of yellow. It slowly conducts thermal impulses, but none of a tactile or chemical nature. Electric impulses are rapidly conducted through the enamel. Its greatest thickness varies from 2.6% to 2 mm. It is thickest at the occlusal surface of the molars, less thick over the premolars and least thick at the incisal edges of the canines and incisors.

Enamel performs a passive function. It aids in the process of the communition of food and is protective to the dentin. It covers this structure and joins the cementum at the cervical line. The relationship of the enamel and cementum may be summarized as follows:

In 60-65% of the specimen examined the enamel is at the cervical line overlapped by the cementum, in 30% of the cases, both structures meet edge to edge, in 5-15% both structures fail to meet and 0.5% of the specimen showed the enamel to be continuous over the cementum. (Thorsen.)

Enamel is attached to the dentin at the amelo-dentinal junction. The enamel is at this place beset with numerous convexities corresponding with concavities on the dentin surface. The amelo-dentinal junction is scalloped in outline (See Fig. II), especially over the cornua of the pulp chamber. Thus it may be readily seen how the enamel and dentin surfaces firmly interlock at the amelo-dentinal junction and cannot be torn apart. The junction is primarily a mechanical one.

Washington State Dental Hygienists' Association

The Washington State Dental Hygienists' Association will exhibit with the Pacific Coast Dental Conference, July 5, 6, 7, 8, 9, 1932, in Seattle, at the Civic Auditorium. An excellent program of essayists and clinicians has been arranged for this conference.

A cordial invitation to attend, is extended to the members of the dental profession, dental hygienists, and dental assistants.

ELIZABETH H. PROCTOR, *President.*
DOROTHY J. WHIPPLE, *Secretary.*
915 Cobb Bldg.,
Seattle, Wash.

Question Box

Questions you desire answered should be received by the Editor on or before the fifth day of the month preceding publication, in order to be answered in the forthcoming issue of THE JOURNAL.

1. Are X-rays for children advisable?

Answer. As a preventive measure alone, they are most valuable. Many parents do not realize the importance of deciduous teeth, nor the part they play in guiding the permanent ones into place. If they might see in "picture form" just how the permanent teeth erupt, the possible impactions, etc., they would become much more interested in the fate of their child's mouth.

X-rays, too, are an aid to the dentist who may for many years have a child under his care and the child should receive the same consideration as an adult.

2. In making plans for a State Convention is it better to have only dental hygienists on the program, or should papers and talks be given by dentists if they are available?

Answer. When possible dentists, physicians and public health workers, the best that may be had, should make up the program. It is only through such persons that another point of view of our work as it is related to general health may be had. School superintendents should also be included, as it is to them we may look for constructive criticism that will enable us to raise the standard of our work in the schools. Even in local monthly meetings it is more desirable to have outside speakers, as it will arouse more interest and be an incentive for better attendance.

3. When unable to attend a school where post-graduate courses for dental hygienists are offered, what may be done as a means for fitting one's self better for her position, in school work particularly?

Answer. Most every University, State College and Teachers' Training School offers extension courses through the winter and summer courses that are available to members of our profession. The Deans of these schools will be glad to help map out a course of study that will aid you in making Dental Hygiene more attractive, not only to the public, but to teachers as well.

How long does Pepsodent Antiseptic reduce bacteria?

IT IS often stated that the effects of any antiseptic are practically momentary. Such is not the fact concerning Pepsodent Antiseptic.

When used as a mouth-wash and gargle, full strength, the number of bacteria in the saliva is reduced 95% to 98%, while at the end of two hours they are still reduced over 80%.

When used with equal parts of water, bacterial counts show a reduction of over 60% at the end of two hours.

The distinct advantage of a reduced number of bacteria on the oral surfaces over a long period of time is a decided aid to the tissues in their fight against invasion by pathogenic bacteria.

It is believed Pepsodent Antiseptic's high germicidal efficiency is only partly responsible for its lasting antiseptic effects. There is evidence that the active agent (chlorothymol) is adsorbed to the tissue surfaces and thus produces a more lasting antiseptic effect.

Pepsodent Antiseptic is a safe and efficient germicide. It is recommended for daily mouth hygiene and in all conditions where the use of an oral antiseptic is indicated.

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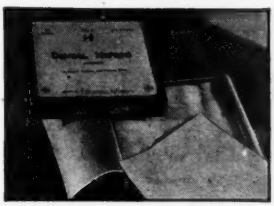

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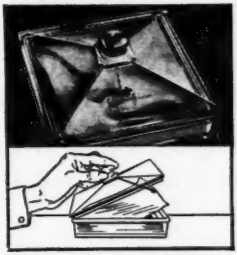

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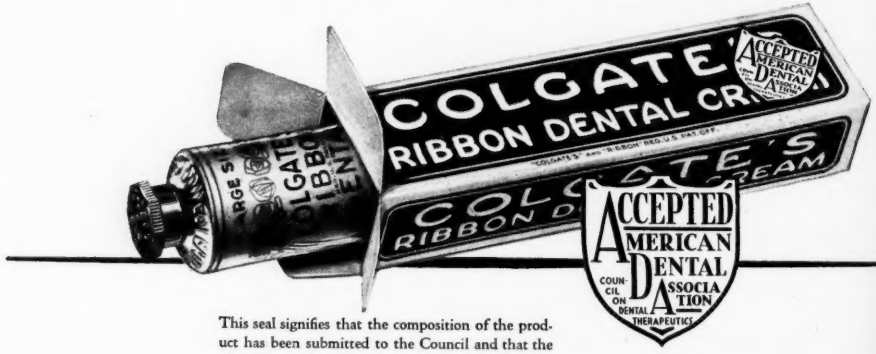

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